Ideas for the Web-based Affective Processing

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Extended abstract :

As most of us subconsciously feel it is a great difficulty to create a program which could imitate human's way of thinking. Recently the importance of the relation between expressions "feel", "create" and "way of thinking" used in a previous sentence is being noticed, which gave birth to so called "affective computing". During our experiments with GENTA (GENeral belief reTrieving Agent), we have observed interesting connotations between common sense information retrieval and emotions, which suggested us to investigate the subject and make up some ideas to share with other researches in this field.

Our system basically unifies two approaches – the idea of the WWW as a substitution for a human brain being a library of experiences and the bottom-up learning method called Bacteria Lingualis. In this method, very basic feelings toward the elements being learned are borrowed from humans but starting point of our approach bases on a much lower level than homo sapiens. As Penrose claims, the intelligence may be a fruit of our development based on Darwinian natural selection. The ideas of how to catch an animal into a trap were developed long time before a human began describing things in an abstractive manner as in logic or mathematics. But we claim that before the machines start to simulate sadness or anger, they must be able to simulate more basic instinct, which should grow into the more sophisticated level called "feelings".

Many of the artificial intelligence researchers agree that bottom-up simplified learning methods are a key to broaden the computer's capabilities and many algorithms were developed so far. The most popular ones are inspired biologically as for example Artificial Neural Networks, genetic algorithms or insect colonies. Their weaknesses differ from one to another but they are not independent and they need

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laborious trainings. "Bacteria Lingualis" has a lot in common with the methods mentioned above but its differences come from the new possibilities brought by the Internet development. By Latin "Bacteria Lingualis" we mean a kind of web crawler which exploits only the textual level of WWW resources and treats it as its natural environment for learning. We assume that cognition, by which we mean the process or result of recognizing, interpreting, judging, and reasoning, can be simulated on the word-level and is strongly influenced by basic instincts, which implementations are usually ignored by the computer scientists.

One of our long-term goals is to model an ethically safe "average web-citizen". In our paper we describe a Positiveness value, which illustrates the basic idea of our approach. GENTA system is able to automatically determine its emotional reaction toward the processed object, by which we mean any textual input, by using just WWW resources but without any complicated logic methods. We applied a simple mechanism which calculates above mentioned Positiveness value retrieved from the Internet users' opinions:

$$Positiveness = \frac{C_{\alpha_1} + C_{\alpha_2} * \gamma}{C_{\beta_1} + C_{\beta_2} * \gamma}$$

$$\alpha_1 = disliked, \alpha_2 = hated$$

$$\beta_1 = liked, \beta_2 = loved, \gamma = 1.3$$

Where γ is to strengthen the "love" and "hate" opinions. This method helps to recognize if an object is

- **very positive** (Positveness = 5)
- **positive** (Positveness = 4)
- **indifferent** (neutral) (Positveness = 3)
- **negative** (Positveness = 2)
- **very negative** (Positveness = 1).

and can provide common information about what humans feel toward the given object. The system recognizes average preferences of humans, what can affectively influence machines replies. For example an utterance "I would like a warm beer" can provoke emotional replies marked with surprise or negative overtone. Oppositely, retrieving the "average" opinions gives a machine a possibility for evaluating human's originality and for choosing interesting replies for itself.

In our opinion, above-mentioned processing could be used not only by Human-Machine Interfaces but by the robots learning in the real environment, too. We are planning such experiments in June and, if possible, we are also going to report their results during the session. Partially our paper we will be devoted to our current works with the idea of Affective Logic, to the role of Affecting Computing in unsupervised learning and to the problems with objective evaluating of subjective results characteristic to this subject.